Adjust 242-A Evaporator Operating Parameters

Tank Farm Plant Operating Procedure 242-A Evaporator

USQ # EV-18-0168-S, Rev. 0

CHANGE HISTORY (≤ LAST 5 REV-MODS)

<table>
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<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
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| O-4     | 01/30/2018   | Operations Request | Pages 6 & 27
Struck out Performance doc TO-600-101 and
5.14.1 IF WVR Control is being used to control the process,
PERFORM Steps 5.14.2 through Step 5.14.7.4.  
5.14.2 OBTAIN the WVR from TO-600-101 using the last
reading provided. |
| O-3     | 06/08/2017   | 242-A Rad Monitor Upgrade Project | 5.7 Modified setpoints in NOTE |
| O-2     | 05/11/2017   | 242-A Rad Monitor Upgrade Project | 5.7 Modified setpoints in NOTE |
| O-1     | 04/06/2017   | 242-A Rad Monitor Upgrade Project | Step 5.7.1 Modified all "RSH to RI"
Step 5.7.1 struck out "/13"
Step 5.7.2 struck out "/10"
Step 5.7.3 struck out "/8" and "/(G44, F26)"
Step 5.7, the first NOTE- delete "/(F30),"
Step 5.7.1, change to read "/(G14,F30/11)" and delete the second
redundant (G14,30).
Step 5.7.2, change to read "/(G17,F18/8)"
Step 5.7.3, change to read "/(G44,F26/8)". |
| O-0     | 05/26/2016   | Periodic Review | 5.15.2 “IF Purge Air Flow is less than 4 1/2 scfm OR IF Purge
Air flow is greater than 6 scfm, Adjust FC-CA1-20 Purge Air
Flow within 4 1/2 to 6 SCFM.” |

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| Table 1 - Dip Tube Plugging Chart                                         | 30   |
1.0 PURPOSE AND SCOPE

1.1 Purpose

To provide instructions for adjusting 242-A Evaporator operational parameters to maintain parameters within operational limits.

1.2 Scope

This procedure applies to the 242-A Evaporator facility and its systems and components.

2.0 INFORMATION

2.1 Terms and Definitions

- ACW  After cooling water
- CNTR  Pulse in counter error
- IBAD  Input error
- OBAD  Error in sending output value to MUX
- OCD  Open circuit detection
- OVER  Input over range
- TMR  Pulse in timer error
- UNDR  Input signal under range
- WVR  Waste Volume Reduction: The volume of free space gained in the double-shell tanks.
2.2 General Information

2.2.1 Evaporator volume control can be accomplished in two modes, MANUAL and AUTO:

- Volume control is considered as MANUAL mode if FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW is operating in AUTO mode with the cascade OPEN. This controls Evaporator vessel volume by controlling the Evaporator feed rate. FIC-CA1-1 setpoint may require some adjustment to correct for field device deficiencies to yield the desired flow value.

- Volume control is considered as AUTO mode if FIC-CA1-1 is operating in AUTO with the cascade CLOSED. This controls Evaporator vessel volume via the setpoint of the level controller LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLLR or LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLLR.

2.2.2 DI-CA1-1 (G10, F2) EVAP CA1-1 SPG or DI-CA1-2 (G10, F2) EVAP CA1-2 SPG can be used with either LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLLR or LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLLR. For ease of maintenance, DI-CA1-1 and LIC-CA1-1 should always be used together and DI-CA1-2 and LIC-CA1-2 should always be used together. However, level or density indicators can be selected as required by plant conditions.

2.2.3 During a loss of vacuum or sudden change, it is not uncommon for the WFI or SpG instruments to go out of range. When vacuum is restored, readings are typically regained. This is likely caused by vapor lock in the transmitters; blowing down the dip tubes will not correct the problem as this is likely a legacy design issue.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Equipment Safety

CAUTION - Raising Reboiler Steam Flow too rapidly could cause flashing of the Evaporator Pot contents, which could lead to high $\Delta P$ on the evaporator Vessel de-entrainer pads and possible damage.

3.2 Limits

OPERATING SPECIFICATION DOCUMENTS (OSDs)

OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
4.0 PREREQUISITES

4.1 Performance Documents

The following procedures will be needed to perform this procedure:

- TO-600-030, Start Up 242-A Evaporator System
- TO-600-060, Shut Down 242-A Evaporator System
- TO-630-040, Sample 242-A Steam Condensate
- TO-630-060, Sample Cooling Water from 242-A, Flush RC-2 Monitoring Pig
- TO-630-080, Operate 242-A RC-3 Sampling System
- TO-660-141, Inject Anti-Foam Chemicals into the 242-A Vapor/Liquid Separator C-A-1
- TO-660-150, Weight Factor Dip Tube Flush
- TO-600-031, Add Water to 242-A Evaporator C-A-1 Vessel
- TO-630-220, Flush RC-1 Monitoring Pig.

4.2 Field Preparations

The following condition must be met before this procedure may commence:

4.2.1 **ENSURE** the Evaporator is in OPERATION mode, with solution in the pot.

4.2.2 **IF** any of the following analog signal alarms occur during the performance of this procedure, **NOTIFY** Shift Manager to determine course of action;

**Alarm Cause**

- CNTR Pulse in counter error
- IBAD Input error
- OBAD Error in sending output value to MUX
- OCD Open circuit detection
- OVER Input over range
- TMR Pulse in timer error
- UNDR Input signal under range.
5.0 PROCEDURE

NOTE - Individual Sections 5.1 through 5.14 may be performed in any order as, process parameter(s) and plant condition(s) dictate.

- Steps within individual Sections 5.1 through 5.14 must be worked in sequence unless identified by flexibility within the work step, a note or by Shift Manager.

5.1 High TI-CA1-6 or TI-CA1-6S Vessel Temperature Reading

NOTE - TI-CA1-6 temperature reading may become unstable if the Evaporator vessel pressure setpoint is below the saturation temperature.

- TI-CA1-6 high temperature alarm setpoint is 140°F.
- PSH-CA1-11 Evaporator vessel high pressure alarm setpoint is 18 inches Hg.

5.1.1 COMPARE TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP and TI-EA1-7S (G13, F13) REBOILER INLET SLURRY SPARE T temperature readings with TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP and TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T temperature readings AND

CONFIRM FEED/SLURRY in C-A-1 vessel is ≤ 140 °F.

5.1.2 MAINTAIN C-A-1 vessel headspace pressure ≤ 100 torr.

5.1.2.1 IF C-A-1 vessel headspace pressure increases to > 100 torr, NOTIFY Shift Manager.

5.1.3 CHECK PIC-CA1-7 (G10/13, F3) EVAP ABSOLUTE PRESSURE current trend (CT 15) trace for recent changes.

5.1.3.1 CHECK PIC-CA1-7 current trend trace shows pressure stable in the recommended pressure range from the Process Memo.

5.1.3.2 IF PIC-CA1-7 is not controlling Evaporator pressure in the desired range, NOTIFY the Shift Manager and Software Engineer of the PIC-CA1-7 controller malfunction AND

SHUT DOWN the Evaporator to recirculation without vacuum mode per TO-600-060.
5.1  High TI-CA1-6 or TI-CA1-6S Vessel Temperature Reading (Cont.)

5.1.4  IF PIC-CA1-7 (G10/13, F3) EVAP ABSOLUTE PRESSURE is controlling Evaporator pressure in the desired range, CHECK DI-CA1-1 (G10, F2) EVAP CA1-1 SPG and DI-CA1-2 (G10, F2) EVAP CA1-2 SPG current trend (CT 1) traces for recent sudden increases, decreases, or differences in readings.

5.1.4.1  IF DI-CA1-1 or DI-CA1-2 are out of tolerance, GO TO Step 5.8.1 to respond to out of tolerance density.

NOTE - The FEED/SLURRY in C-A-1 vessel must be maintained at \( \leq 140 \^\circ\text{F} \).

5.1.5  IF TIC-CA1-6 (G10, F4) EVAP SLURRY TEMP,

\[
\text{OR}
\]

IF TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T still indicates a high temperature, PERFORM the following:

5.1.5.1  NOTIFY the Shift Manager and Engineering.

5.1.5.2  CONTINUE to monitor TIC-CA1-6 or TI-CA1-6S temperature.
5.2 High PIC-CA1-7 Pressure Reading

NOTE - PIC-CA1-7 (G10/13, G16/10, F3, F14) EVAP ABSOLUTE PRESSURE pressure reading may become unstable if the Evaporator vessel pressure setpoint is below the saturation pressure.

- C-A-1 vessel headspace pressure must be maintained ≤ 100 torr.

5.2.1 CHECK PIC-CA1-7 (G10/13, F3) EVAP ABSOLUTE PRESSURE current trend (CT 15) trace for recent changes.

5.2.1.1 CHECK PIC-CA1-7 current trend trace shows pressure stable in recommended pressure range from Process Memo.

5.2.1.2 IF PIC-CA1-7 is not controlling Evaporator pressure in the desired range, NOTIFY Shift Manager and Software Engineer of PIC-CA1-7 controller malfunction AND

SHUT DOWN Evaporator to recirculation without vacuum per TO-600-060.
5.3 Out-of-Tolerance Evaporator Liquid Level (LIC-CA1-1 or LIC-CA1-2)

Evaporator Volume Control

5.3.1 IF Evaporator Level is in MANUAL Mode (i.e., FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW is in AUTO mode with its cascade OPEN), PERFORM the following. (OSD-T-151-00012)

5.3.1.1 SELECT FIC-CA1-1.

5.3.1.2 IF Evaporator level is LOW, INCREASE feed flow to the Evaporator.

5.3.1.3 IF Evaporator level is HIGH, DECREASE feed flow to the Evaporator.

5.3.1.4 MONITOR LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR and LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR as the Evaporator level changes.

5.3.1.5 REPEAT Steps 5.3.1.2 through 5.3.1.4 until LIC-CA1-1 and LIC-CA1-2 are stabilized at 24,500 (23,500 to 25,000) gallons.

5.3.2 IF Evaporator level cannot be maintained in either AUTO mode or MANUAL mode,

OR

IF LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR and LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR level readings differ by greater than 300 gallons, THEN

PERFORM the following.

5.3.2.1 NOTIFY the Shift Manager of the conditions.

5.3.2.2 PERFORM Steps 5.3.8 through 5.3.12 to troubleshoot the level control problems.
5.3 Out-of-Tolerance Evaporator Liquid Level (LIC-CA1-1 or LIC-CA1-2) (Cont.)

5.3.3 IF Evaporator is in either "Recirculation with Vacuum" or "Recirculation without Vacuum" AND

IF Evaporator level is LOW as read on the following:
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR

OR

IF Shift Manager requests the level to be increased,
ADD water per TO-600-031.

5.3.4 NOTIFY Shift Manager of the final level of the C-A-1 vessel.

IF evaporator is in either "Recirculation with Vacuum" or "Recirculation without Vacuum,” and evaporator level is HIGH as read on the following:
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR

OR

IF Shift Manager requests the level be reduced,
REDUCE level per TO-600-030.

Gravity Slurry Out

5.3.5 IF directed by Shift Manager, PERFORM gravity slurry per TO-600-030.

Feed Line Drain Back

5.3.6 IF directed by Shift Manager, PERFORM Feed line drain back per TO-600-030.
5.3 Out-of-Tolerance Evaporator Liquid Level (LIC-CA1-1 or LIC-CA1-2) (Cont.)

5.3.7 NOTIFY Shift Manager of the final level of the C-A-1 vessel.

5.3.8 CHECK the following Current Trend (CT 1) traces and determine if there are any plugged dip tubes:
- DI-CA1-1 (G10, F2) EVAP CA1-1 SPG
- DI-CA1-2 (G10, F2) EVAP CA1-2 SPG
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD.

5.3.8.1 CHECK DI-CA1-1 and DI-CA1-2 Current Trend traces and Table 1 to determine if there are any plugged dip tubes.

5.3.8.2 CHECK WFI-CA1-1 and WFI-CA1-2 current trend traces and Table 1 to determine if there are any plugged dip tubes.

5.3.9 IF the evidence in Step 5.3.8 shows a dip tube is plugging, ENSURE the following have the unaffected points selected for control.
- SELECT-DI (G10/11, F2) POT SPG SELECTOR FOR LEVL CONTROL and
- SELECT-WF (G10/8, F2) POT WF SELECTOR FOR LEVL CONTROL.

5.3.10 IF requested by Shift Manager to perform instrument air purge on plugging dip tube, SET PB-1 ILK 15 (G12/7, F5) PB-1 WT FACTR INTERLOK BYPASS to BYPASS.
5.3 Out-of-Tolerance Evaporator Liquid Level (LIC-CA1-1 or LIC-CA1-2) (Cont.)

5.3.11 SET PB-2 ILK 15 (G15/7, F9) PB-2 WT FAC INTERLOK BYPASS to BYPASS.

NOTE - Following instruments are located in Condenser Room on the 5th floor.

5.3.11.1 IF performing air purge on Dip Tube 1D, PLACE FIC-CA1-16 fully OPEN for approximately 5 minutes AND ADJUST FIC-CA1-16 to establish air flow to between 1.0 and 1.5 scfh.

5.3.11.2 IF performing air purge on Dip Tube 1F, PLACE FIC-CA1-17 fully OPEN for approximately 5 minutes AND ADJUST FIC-CA1-17 to establish air flow to between 1.0 and 1.5 scfh.

5.3.11.3 IF performing air purge on Dip Tube 2G, PLACE FIC-CA1-15 fully OPEN for approximately 5 minutes AND ADJUST FIC-CA1-15 to establish air flow to between 1.0 and 1.5 scfh.

5.3.11.4 IF performing air purge on Dip Tube 2E, PLACE FIC-CA1-14 fully OPEN for approximately 5 minutes AND ADJUST FIC-CA1-14 to establish air flow to between 1.0 and 1.5 scfh.

5.3.12 IF Dip Tube cannot be unplugged, FLUSH Dip Tube in per TO-660-150.
5.4 **Increasing PDI-CA1-1 Lower De-Entrainer Pad ΔP**

**NOTE** - PDI-CA1-1 (F3) EVAP LOWER DE-ENTRN DELTA P alarm setpoint is 3.5 inches WG.

5.4.1 **CHECK** FIC-CA1-6 (G10/5, F3) UPPER DE-ENTRN SPRAY FLOW as it cycles through all four nozzles for plugged spray nozzles.

5.4.2 **INCREASE** anti-foam rate to 0.1 gpm per TO-660-141 or as directed by campaign process memo or Shift Manager.

5.4.3 **REDUCE** steam flow to decrease boil-off rate per TO-600-060 or as directed by Shift Manager.

5.4.4 **IF** the Upper De-Entrainer pad sprays are not in service, **PLACE** the Upper De-Entrainer pad sprays in service per TO-600-030.

5.4.5 **IF** the Upper De-Entrainer pad sprays are in service, **REQUEST** the Backside Operator OPEN Lower De-Entrainer pad spray isolation valves 5-71 and 5-76, located on the fifth level of the Condenser Room.

**NOTE** - The lower pad sprays are not totalized by FIC-CA1-6. If filtered raw water is being used for pad sprays, the time the lower pad sprays are “ON” should be monitored so an estimate of water usage can be made.

- If PC-106 is on line, starting pad sprays will affect pressure and flow to PB-1 / PB-2 seals. Starting sprays slowly will lessen this impact. Monitoring of current trends 8 and 47 will provide signs of impact.

5.4.6 **IF** filtered raw water is being used for pad sprays, **MONITOR** the time the lower pad sprays are “ON” to provide an estimate of water usage.

5.4.7 **START** HIC-CA114 (G10/6, F3) LOWER DE-ENTRN TOP SPRAY.

5.4.7.1 **SELECT** HIC-CA114 AND

**IN** slow increments of 10, **START** the lower De-Entrainer top sprays.

5.4.8 **START** HIC-CA115 (G10/7, F3) LOWER DE-ENTRN BOTTOM SPRAY.

5.4.8.1 **SELECT** HIC-CA115 AND

**IN** slow increments of 10, **START** the lower De-Entrainer bottom sprays.
5.4 Increasing PDI-CA1-1 Lower De-Entrainer Pad ΔP (Cont.)

5.4.9 **MONITOR** PDI-CA1-1 (G10, F3) EVAP LOWER DE-ENTRN ΔP.

5.4.10 **AFTER** PDI-CA1-1 (G10, F3) EVAP LOWER DE ENTRN ΔP reads less than 2 inches WG, **SHUT DOWN** lower de-entrainer pad sprays, unless otherwise directed by Shift Manager.

5.4.10.1 **SET** HIC-CA114 (G10/6, F3) LOWER DE-ENTRN TOP SPRAY to “OUTPUT”, “0”.

5.4.10.2 **SET** HIC-CA115 (G10/7, F3) LOWER DE-ENTRN BOTTOM SPRAY to “OUTPUT”, “0”.

5.4.10.3 **REQUEST** the Backside Operator CLOSE the following valves on the fifth level of the Condenser Room.

- Valve 5-71
- Valve 5-76

5.4.11 **IF** PDI-CA1-1 (G10, F3) EVAP LOWER DE ENTRN ΔP does not decrease to less than 2 inches WG,

**OR**

**IF** the High ΔP reoccurs, **PERFORM** the following:

5.4.11.1 **ENSURE** anti-foam chemicals are being properly injected per TO-660-141, “Inject Anti-Foam Chemicals into the Vapor/Liquid Separator C-A-1.”.

5.4.11.2 **INCREASE** anti-foam concentration (decrease dilution) to 7% or 10% per TO-660-141 or as directed by Shift Manager.

5.4.12 **IF** anti-foam chemical injection does not prevent the high ΔP from occurring, **NOTIFY** the Shift Manager the De-Entrainer pads require flushing.
5.5 Increasing PDI-CA1-2 Upper De-Entrainer Pad ΔP

NOTE - PDI-CA1-2 (F3) EVAP UPPER DE-ENTRN DELTA-P alarm setpoint is 3.5 inches WG.

5.5.1 CHECK PDI-CA1-1 (G10, F3) EVAP LOWER DE-ENTRN DELTA-P.

5.5.2 IF PDI-CA1-1 (G10, F3) EVAP LOWER DE-ENTRN DELTA-P reads greater than 2 inches WG, GO TO Step 5.4.1.

5.5.3 IF PDI-CA1-1 (G10, F3) EVAP LOWER DE-ENTRN DELTA-P reads less than 2 inches WG, NOTIFY the Shift Manager the upper De-Entrainers require troubleshooting.
5.6 High TIC-EC1-2 Process Condensate Condenser Outlet Temperature

NOTE - TIC-EC1-2 (G16/8, F14) E-C-1 PC OUTLET TEMP temperature high alarm setpoint is 110°F.

5.6.1 INCREASE E-C-1 condenser cooling water flow.

5.6.1.1 SELECT FIC-EC1-1 (G17/5, F18) E-C-1 CONDENSR URW FLOW CONTROLR AND

INCREASE FIC-EC1-1 output and E-C-1 cooling water flow.

NOTE - After E-C-1 cooling water flow is increased in Step 5.6.1.1, several minutes will be required to observe a decrease in E-C-1 outlet temperature on TIC-EC1-2.

5.6.1.2 MONITOR TIC-EC1-2 (G16/8, F14) E-C-1 PC OUTLET TEMP.

5.6.1.3 IF TIC-EC1-2 (G16/8, F14) E-C-1 PC OUTLET TEMP temperature reading does not stabilize or decrease, REPEAT Steps 5.6.1.1 and 5.6.1.2.

5.6.2 IF TIC-EC1-2 (G16/8, F14) E-C-1 PC OUTLET TEMP temperature does not decrease to less than 110°F and FIC-EC1-1 (G17/5, F18) E-C-1 CONDENSR URW FLOW CONTROLR output reaches 100%, DECREASE steam flow rate to the Reboiler.

5.6.2.1 MONITOR TIC-EC1-2.

NOTE - Reducing Reboiler steam flow with FIC-EA1-1 must be done slowly to prevent lifting steam pressure relief valves.

- FIC-EA1-1 output should not be lowered more than 5% at one time.

5.6.2.2 SELECT FIC-EA1-1 G13/8, F12) REBOILER STEAM FLOW AND

SLOWLY LOWER Reboiler steam flow in 5% or less increments.

5.6.2.3 WAIT for FIC-EA1-1 steam flow value to stabilize before reducing FIC-EA1-1 output value further.
5.6 High TIC-EC1-2 Process Condensate Condenser Outlet Temperature (Cont.)

5.6.2.4 **REPEAT** Step 5.6.2.2 and 5.6.2.3 until TIC-EC1-2 reads less than 110°F.

5.6.2.5 **IF** FIC-EA1-1 output reaches “0” and TIC-EC1-2 still reads greater than 110°F, **NOTIFY** Shift Manager and Engineering.
### Adjust 242-A Evaporator Operating Parameters

#### 5.7 RI-RC1-1 SC Sampler, RI-RC2-1 URW Sampler, and RI-RC3-1 PC Sampler Increasing Radiation

**NOTE** - The RI-RC1-1 SC Sampler high alarm setpoint is 16 cps.
- The RI-RC2-1 URW Sampler high radiation alarm setpoint is 24 cps above background (15 cps is typical).
- The RI-RC3-1 PC Sampler high radiation alarm setpoint is 132 cps.
- When performing flushes of the radiation monitor pigs below, the current trend trace of the point being flushed should be monitored while the flush is in progress.

**5.7.1** IF RI-RC1-1 (G14, F30) STEAM CONDSATE SAMPLER RADN is increasing, **PERFORM** the following actions:

**5.7.1.1** MONITOR the current trend trace of the point being flushed while the flush is in progress.

**5.7.1.2** FLUSH the RC-1 Monitoring Pig per TO-630-220.

**5.7.1.3** AFTER flushing is complete, **MONITOR** RI-RC1-1 for at least 15 minutes.

**5.7.1.4** IF RI-RC1-1 is still increasing, **NOTIFY** Shift Manager and Engineering.

**5.7.2** IF RI-RC2-1 (G17, F18) URW SAMPLER RADN is increasing, **PERFORM** the following actions:

**5.7.2.1** MONITOR the current trend trace of the point being flushed while the flush is in progress.

**5.7.2.2** FLUSH the RC-2 Monitoring Pig per TO-630-060.

**5.7.2.3** AFTER flushing is complete, **MONITOR** RI-RC2-1 for at least 15 minutes.

**5.7.2.4** IF RI-RC2-1 is still increasing, **NOTIFY** Shift Manager and Engineering.
5.7 RI-RC1-1 SC Sampler, RI-RC2-1 URW Sampler, and RI-RC3-1 PC Sampler Increasing Radiation (Cont.)

5.7.3 IF RI-RC3-1 (G44, F26) PROCESS CONDSATE SAMPLER RADN is increasing, **PERFORM** the following actions:

5.7.3.1 **MONITOR** the current trend trace of the point being flushed while the flush is in progress.

5.7.3.2 **FLUSH** the RC-3 Monitoring Pig per TO-630-080.

5.7.3.3 **AFTER** flushing is complete, **MONITOR** RI-RC3-1 for at least 15 minutes.

5.7.3.4 **IF** RI-RC3-1 is still increasing, **NOTIFY** Shift Manager and Engineering.
5.8 Out-Of-Tolerance Density Condition (DI-CA1-1 or DI-CA1-2)

5.8.1 CHECK the following readings:
- DI-CA1-1 (G10, F2) EVAP CA1-1 SPG
- DI-CA1-2 (G10, F2) EVAP CA1-2 SPG.

5.8.1.1 IF Specific gravity of the FEED/SLURRY in C-A-1 is > 1.56 SpG, NOTIFY Shift Manager/OE.

5.8.2 IF DI-CA1-1 (G10, F2) EVAP CA1-1 SPG and DI-CA1-2 (G10, F2) EVAP CA1-2 SPG readings differ by greater than 0.10, CHECK the following Current Trend (CT 1) traces and Table 1 to determine if there are any plugged dip tubes
- DI-CA1-1 (G10,F2) EVAP CA1-1 SPG
- DI-CA1-2 (G10,F2) EVAP CA1-2 SPG
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD.

5.8.3 IF the evidence in Step 5.8.2 shows that a dip tube is plugging, ENSURE SELECT-DI (G10/11, F2) POT SPG SELECTOR FOR LEVL CONTROL and SELECT-WF (G10/8, F2) POT WF SELECTOR FOR LEVL CONTROL have the unaffected points selected for control AND

NOTIFY Shift Manager dip tubes may need flushing.
5.9 Potential TK-C-103 Weir Overflow (FI-RC1-1)

5.9.1 IF the Steam Condensate IN Weir BOX (TK-C-103) begins to back up during operation, indicated by either a flow rate of >104.4 gpm, OR

IF an OVER/RANGE alarm on FI-RC1-1 (F30) STEAM CONDSATE FLOW TO SC BASIN, REDUCE FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW Reboiler steam flow.

NOTE - Reducing Reboiler steam flow with FIC-EA1-1 must be done slowly to prevent lifting from steam pressure relief valves.

5.9.2 MONITOR the following as FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW is being decreased:

- PI-EA1-1 (G13, F12) REBOILER STEAM INLET PRESSURE and
- TI-DSH-2 (G13, F12) DESUP INLET 10# STM TEMP or TI-DSH-3 (G13, F12) REBOILER STEAM INLET TEMP.

NOTE - FIC-EA1-1 output should not be lowered more than 5% at one time.

5.9.3 SELECT FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW AND SLOWLY LOWER Reboiler steam flow in 5% or less increments.

5.9.4 MONITOR FI-RC1-1 (F30) STEAM CONDSATE FLOW TO SC BASIN as steam flow is decreased.

5.9.5 WAIT for FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOWs value to stabilize before reducing FIC-EA1-1 output value further.

5.9.6 REPEAT Steps 5.9.2 to 5.9.5 until FI-RC1-1 (F30) STEAM CONDSATE FLOW TO TEDF is not OVER/RANGE or it is indicating less than 104.4 gpm.
5.10  **Respond to Low Steam Trap Temperature Reading**

5.10.1  **IF** the temperature reading across a steam trap is out of specification **BLOW DOWN** steam trap **AND**

**RE-PERFORM** temperature reading.

5.11  **Respond to Abnormal Steam Condensate Trap Level**

5.11.1  **IF** steam trap(s) 242-A-60 and/or 242-A-61 sight glass water reading is over 50%, **PERFORM** the following:

5.11.1.1  **OPEN** SST-1 valve 2-12A for approximately 1 minute.

5.11.1.2  **CLOSE** SST-1 valve 2-12A.

5.11.1.3  **OPEN** SST-2 Valve 2-15A for approximately 1 minute.

5.11.1.4  **CLOSE** SST-2 Valve 2-15A.

5.11.1.5  **OPEN** SST-3 Valve 2-18A for approximately 1 minute.

5.11.1.6  **CLOSE** SST-3 Valve 2-18A.
5.12 Low Steam Flow

5.12.1 IF the steam flow at FIC-EA1-1 is not adequate, PERFORM the following:

5.12.1.1 CHECK the following Steam Trap sight glasses

____  •  242-A-60
____  •  242-A-61

5.12.1.2 IF water cannot be seen in sight glasses, PERFORM the following:

a. OPEN SST-1 valve 2-12A for approximately 1 minute.

b. CLOSE SST-1 valve 2-12A.

c. OPEN SST-2 Valve 2-15A for approximately 1 minute.

d. CLOSE SST-2 Valve 2-15A.

e. OPEN SST-3 Valve 2-18A for approximately 1 minute.

f. CLOSE SST-3 Valve 2-18A.

5.12.1.3 IF directed by shift manager contact JCI.
5.13 Out-Of-Tolerance Density on DI-CA1-3

5.13.1 IF specific gravity of the FEED/SLURRY in C-A-1 vessel reaches >1.56 SpG, NOTIFY Shift Manager/OE.

5.13.2 IF Density Control is being used to control the process, PERFORM the following:

5.13.2.1 READ the SpG from DI-CA1-3 (G10, F4/7) RECIRC BYPASS SLURRY DENSITY.

5.13.2.2 IF the SpG is above the target SpG provided in the Process Memo, INCREASE slurry flow rate per Step 5.14.4,

OR

DECREASE boil-off rate per Step 5.14.5.

5.13.2.3 IF the SpG is below the target SpG provided in the Process Memo, DECREASE slurry flow rate per Step 5.14.4,

OR

INCREASE boil-off rate per Step 5.14.5.

NOTE - When PB-2 pump is shut off to gravity slurry out, a Low-Low alarm will be received if the flow decreases to less than 33.0 gpm. When PB-2 pump is restarted the flow rate needs to be 34.0 gpm or greater to clear the dead band, and clear the Low-Low alarm.

5.13.2.4 IF gravity slurry is required to maintain SpG within operating range specified by Process Memo, SET PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to CF-OFF.

5.13.2.5 WHILE gravity slurring, MONITOR operating parameters and duration to ensure compliance with the Process Memo requirements.

5.13.2.6 WHEN required SpG is obtained and gravity slurry is no longer required or as required by process memo, START PB-2 Transfer Pump as follows.
5.13 Out-Of-Tolerance Density on DI-CA1-3 (Cont.)

5.13.2.7 SET SIC-PB2-1 (G15/15, F10) SLURRY PUMP SPEED CONTROLR for automatic control as follows:

NOTE  SIC-PB2-1 SLURRY PUMP SPEED CONTROLR will require several seconds for the change from MANUAL to AUTO modes to take effect.

a. IF SIC-PB2-1 shows an OPEN Cascade (a white "O"), PRESS “CASC” twice to close the Cascade.

b. CHECK that SIC-PB2-1 shows a closed Cascade (a green "C").

5.13.2.8 ENSURE FIC-CA1-4 (G15/14, F10) EVAP SLURRY FLOW is in AUTO.

5.13.2.9 SET FIC-CA1-4 set point to “0”.

5.13.2.10 SET PB 2 (G15/6, F9) SLURRY TRANSFER PUMP to CF-ON.

5.13.2.11 SET slurry output as follows:

a. SET FIC-CA1-4 (G15/14, F10) EVAP SLURRY FLOW to setpoint 34.5.

b. MONITOR FIC- CA1-4 AND ENSURE that the “Low-Low” flow alarm clears.

c. SET FIC-CA1-4 to the desired flowrate.

5.13.2.12 IF the SpG goes out of the permissible operating range specified in the Process Memo, SWITCH to WVR Control if allowed by Process Memo per Step 5.14.4,

OR

PLACE the pot in RECIRC MODE with or without vacuum per TO-600-060 AND

NOTIFY the Shift Manager.
5.14 Out-Of-Tolerance WVR

5.14.1 IF the WVR is above the target WVR provided in the Process Memo, 
INCREASE slurry flow rate per Step 5.14.4,

OR

DECREASE boil-off rate per Step 5.14.5.

5.14.2 IF the WVR is below the target WVR provided in the Process Memo, 
DECREASE slurry flow rate per Step 5.14.4,

OR

INCREASE boil-off rate per Step 5.14.5.

5.14.3 IF the WVR goes out of the permissible operating range for a period of time specified in the Process Memo, PLACE the pot in RECIRC MODE with or without vacuum per TO-600-060 AND

NOTIFY the Shift Manager.

5.14.4 ADJUST slurry flow rate as follows:

NOTE The FIC-CA1-4 flow rate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

5.14.4.1 SELECT FIC-CA1-4 (G15/14, F10) EVAP SLURRY FLOW and either increased or decreased slurry out flow rate designated by Sections 5.13 or 5.14.

5.14.4.2 CHECK FIC-CA1-4 setpoint changes to the required value.
5.14 Out-Of-Tolerance WVR (Cont.)

CAUTION
Raising Reboiler Steam Flow too rapidly could also cause flashing of the Evaporator Pot contents, which could lead to high ΔP on the evaporator Vessel de-entrainer pads and possible damage.

5.14.5 ADJUST FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW to attain the boil-off rate determined in Sections 5.13 or 5.14 as follows:

5.14.5.1 MONITOR the following points as Reboiler Steam Flow is raised;
- FI-EC1-2 E-C-1 (G16, F14) CONDENSR FLOW
- PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE
- TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP
- TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP.

NOTE FIC-EA1-1 output should not be raised more than 3% at one time.

5.14.5.2 SELECT FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW AND SLOWLY RAISE OR LOWER Reboiler Steam flow.

5.14.5.3 ALLOW the following readings to stabilize:
- FI-EC1-2, (G16, F14) E-C-1 CONDENSR PC FLOW,
- PIC-CA1-7, (G16/10, F14) EVAP ABSOLUTE PRESSURE,
- TI-CA1-6, (G10, F4) EVAP VESSEL SLURRY TEMP, and
- TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP.

5.14.5.4 REPEAT Steps 5.14.5.2 and 5.14.5.3 until the boil-off rate determined in Sections 5.13 or 5.14 is attained.

5.14.6 IF adequate steam flow cannot be obtained, PERFORM Section 5.12.
5.15  Monitor and Adjust Purge Air Flow

NOTE - If purge air is not required, monitoring and adjustment of Purge Air is not required.

5.15.1  READ Purge Air Flow from FI-CA1-20.

5.15.2  IF Purge Air Flow is less than 4 ½ scfm

OR

IF Purge Air Flow is greater than 6 scfm, ADJUST FC-CA1-20 Purge Air Flow within 4 ½ to 6 scfm.

5.16  Records

NOTE - No records are generated during the performance of this procedure.
### Table 1 - Dip Tube Plugging Chart

<table>
<thead>
<tr>
<th>MCS Point</th>
<th>Number of Plugging Dip Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1D</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
<td>Increase</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
<td>No Change</td>
</tr>
<tr>
<td>DI-CA1-1</td>
<td>Decrease</td>
</tr>
<tr>
<td>DI-CA1-2</td>
<td>No Change</td>
</tr>
<tr>
<td>LIC-CA1-1 with DI-CA1-1 selected</td>
<td>Rapid Increase</td>
</tr>
<tr>
<td>LIC-CA1-1 with DI-CA1-2 selected</td>
<td>Increase</td>
</tr>
<tr>
<td>LIC-CA1-2 with DI-CA1-1 selected</td>
<td>Increase</td>
</tr>
<tr>
<td>LIC-CA1-2 with DI-CA1-2 selected</td>
<td>No Change</td>
</tr>
</tbody>
</table>